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FULL CONTENTS CLAIM + DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT
OF THE INVENTION TECHNICAL PROBLEM MEANS EXAMPLE

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Notes:

1. Untranslatable words are replaced with asterisks (* ** *).
2. Texts in the figures are not translated and shown as it is.

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CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1]

Are watercolor pigment dispersion liquid containing the copolymerization resin which consists of a monomer component which has a pigment, a water-soluble organic solvent, and a styrene monomer and an acid radical, and the content of the styrene monomer component in this copolymerization resin is 50 to 90 weight %, and said pigment is received. Watercolor pigment dispersion liquid characterized by containing 0.01 to 10weight % of inorganic acid ghost particles.

[Claim 2]

Watercolor pigment dispersion liquid according to claim 1 whose monomer which has an acid number is an acrylic acid (meta) system monomer.

[Claim 3]

Watercolor pigment dispersion liquid according to claim 2 whose ratio of resin to a pigment is 50 or less weight %.

[Claim 4]

Watercolor pigment dispersion liquid according to claim 1 whose pigment is the Quinacridone system pigment.

[Claim 5]

The ink composition for ink jet recording produced from Claim 1 - one watercolor pigment dispersion liquid of four.

[Claim 6]

Are the manufacture method of watercolor pigment dispersion liquid, and a pigment, a water-soluble organic solvent, a styrene monomer, and the monomer component that has an acid radical are polymerized. The manufacture method of the watercolor pigment dispersion liquid which have the process which distributes the becoming copolymerization resin and the mixture which contains 0.01 to 10weight % of inorganic acid ghost particles to said pigment, and are characterized by the content of the nonaqueous solubility monomer component in this copolymerization resin being 50 to 90 weight %.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the manufacture method of watercolor pigment dispersion liquid suitable for manufacture of the watercolor pigment ink composition for ink jet recording, and watercolor pigment dispersion liquid, concerning the manufacture method of watercolor pigment dispersion liquid and these watercolor pigment dispersion liquid.

[0002]

[Description of the Prior Art]

The ink in which the aqueous ink for ink jet recording used the pigment for the water resisting property of a printing image or light-fast improvement is proposed, and improvement of the characteristics is made variously. For example, in JP,4-18461,A, carbon black and an acid number are 250 or more water soluble resin. When the quantity of said water soluble resin which the ink for ink jet recording which makes it the feature to contain is indicated, and is dissolving into ink is 2 or less weight %, it is indicated that a jetting stability increases. Usually, in this way, in order that the ink for ink jet recording using a pigment may secure the print quality of a jetting stability and high resolution, there is very little content of a resinous principle compared with common pigment ink. For this reason, there is a problem that the preservation stability of an ink composition falls easily. Moreover, the scuff resistance and the water resisting property of the printing image tend to become inadequate according to the water solubility of resin being high and there being still less content of a resinous principle.

[0003]

therefore, the ink jet recording which was excellent in preservation stability and was excellent in the water resisting property of a printing image, and scuff resistance with the jetting stability -- service water -- realization of the sex pigment ink constituent became important.

However, only by making water solubility of resin low, in order to fill the above-mentioned demand, although a water resisting property and scuff resistance improve, the dispersibility of an ink composition falls and preservation stability falls easily. Moreover, although scuff resistance and a water resisting property improve and preservation stability also improves, the viscosity of ink rises easily and it is easy to generate the instability of the discharge by nozzle clogging etc. only by increasing the content of a resinous principle. Therefore, the watercolor pigment dispersion liquid with which it was simultaneously satisfied of these many characteristics are called for.

[0004]

In JP,8-231906,A, it is as an example of an improvement of especially a picture water resisting property in order to solve such a problem, the ink jet recording containing a styrene system copolymer -- service water -- sex ink is proposed and the constituent adjusted ["resin acid value"] to less than 120% 40% or more in 20 - 70 mg/KOH and "basic compound content" is indicated.

[0005]

As other approaches for raising scuff resistance and a water resisting property further again The example which adding inorganic acid ghost colloid, such as colloidal silica, to an ink composition is proposed, for example, added colloidal silica and alkali metal hydroxide to the ink composition at JP,11-12516,A is indicated.

[0006]

[Problem(s) to be Solved by the Invention]

However, although there was an effect in raising a water resisting property and scuff resistance, it could not be difficult to improve the preservation stability of watercolor pigment dispersion liquid simultaneously, and it was not able to fill simultaneously good dischargeability, good preservation stability and a good water resisting property, and scuff resistance with the method indicated in the aforementioned literature. It was not what can be especially satisfied about coexistence of the discharge characteristics in a thermal method, and preservation stability.

[0007]

Furthermore, although the trial which adds a lot of polymer emulsions etc. in ink as the scuff resistance of a printing image or a waterproof improvement is made, a problem is in increase and the jetting stability of the viscosity of an ink composition. The ink with which it is satisfied of all these characteristics is not yet obtained, but the still improved trial is performed.

[0008]

the ink jet recording with which the purpose of this invention is simultaneously satisfied of preservation stability especially long-term preservation stability, and the water resisting property of a printing image -- service water -- it is offering the manufacture method of watercolor pigment dispersion liquid and these watercolor pigment dispersion liquid which can produce a sex pigment ink constituent.

[0009]

[Means for Solving the Problem]

In the watercolor pigment dispersion liquid which contain at least a pigment, the copolymerization resin which polymerizes a styrene monomer and the monomer component which has an acid radical, and a water-soluble organic solvent as a result of inquiring wholeheartedly that this invention persons should solve the above-mentioned technical problem By making content of the styrene monomer component in said copolymerization resin into the specific range, and making inorganic acid ghost particles contain in said watercolor pigment dispersion liquid the ink jet recording excellent in long-term preservation stability, the water resisting property of a printing image, and scuff resistance -- service water -- it found out that the watercolor pigment dispersion liquid which can produce a sex pigment ink constituent were obtained.

[0010]

[namely, this invention] Are watercolor pigment dispersion liquid containing the copolymerization resin

which consists of a monomer component which has a pigment, a water-soluble organic solvent, and a styrene monomer and an acid radical, and the content of the styrene monomer component in this copolymerization resin is 50 to 90 weight %, and said pigment is received. The watercolor pigment dispersion liquid characterized by containing 0.01 to 10weight % of inorganic acid ghost particles are offered.

[0011]

The watercolor pigment dispersion liquid of this invention contain the copolymerization resin which consists of a monomer component which has a styrene monomer and an acid radical, and since the content ratio of the styrene monomer component in this copolymerization resin is 50 to 90 weight %, the water resisting property of the film of a printing image and its scuff resistance are high. Usually, [when it contains resin with a ratio of a styrene monomer component high in this way, the dispersibility of watercolor pigment dispersion liquid falls, but] Since the watercolor pigment dispersion liquid of this invention contain inorganic acid ghost particles, dispersibility cannot fall and they can maintain the long-term preservation stability of these watercolor pigment dispersion liquid to the high level.

[0012]

Since inorganic acid ghost particles are furthermore contained in watercolor pigment dispersion liquid, a jetting stability maintenance sake even if it reduces the amount of resin in watercolor pigment dispersion liquid, the preservation stability of a pigment is realizable -- ink jet recording -- service water -- the dischargeability and long-term preservation stability when forming a sex pigment ink constituent can be fulfilled simultaneously.

Moreover, since the watercolor pigment dispersion liquid of this invention have many ratios of the nonaqueous solubility monomer component like styrene ink jet recording -- service water -- the ink jet recording which was [even if] excellent in the scuff resistance and the water resisting property of a printing image, and color enhancement even when there were few amounts of resin in an ink composition when sex pigment ink was produced -- service water -- it can be considered as a sex pigment composition.

[0013]

In the manufacture method of the watercolor pigment dispersion liquid of this invention, a pigment and a water-soluble organic solvent, After producing the mixture containing the copolymerization resin which consists of a monomer component which has a styrene monomer and an acid radical, distributing this and obtaining watercolor pigment dispersion liquid, may add inorganic acid ghost particles, but A pigment, After producing the mixture containing a water-soluble organic solvent, inorganic acid ghost particles, and the copolymerization resin that consists of a monomer component which has a styrene monomer and an acid radical, when the manufacture method which distributes and produces this is used, since the development of the sediment of watercolor pigment dispersion liquid is controlled more, it is desirable.

[0014]

pass the process which dilutes the watercolor pigment dispersion liquid of this invention to an aqueous medium -- ink jet recording -- service water -- the ink jet recording which was excellent in dischargeability, long-term preservation stability, and the water resisting property and scuff resistance of a printing image by manufacturing a sex pigment ink constituent -- service water -- a sex pigment ink constituent can be obtained.

[0015]

[Embodiment of the Invention]

It is desirable that the monomer which has an acid radical is an acrylic acid (meta) system monomer as copolymerization resin which consists of a styrene monomer used for the watercolor pigment dispersion liquid of this invention and a monomer component which has an acid radical. The dispersibility of watercolor pigment dispersion liquid can be raised more by using an acrylic acid system monomer as a monomer (meta) which has an acid radical.

[0016]

Although the pigment of the large range can be used for the watercolor pigment dispersion liquid of the invention in this application centering on the pigment usually used for ink jet recording the ink jet recording which was [especially the pigment] large at the time of the Quinacridone system pigment ****, and was excellent in dischargeability, long-term preservation stability, the water resisting property of a printing image, and scuff resistance -- service water -- a sex pigment ink constituent can be manufactured. [of the effect]

[0017]

In the watercolor pigment dispersion liquid of this invention, after producing the mixture containing a pigment, a water-soluble organic solvent, inorganic acid ghost particles, and the copolymerization resin that consists of a monomer component which has a styrene monomer and an acid radical, since preservation stability will improve more if this is distributed and it is produced, it is desirable. [when producing the watercolor pigment dispersion liquid which contain the copolymerization resin which polymerizes a pigment, a water-soluble organic solvent, and a styrene monomer and the monomer component which has an acid radical, and contain inorganic acid ghost particles further] by the manufacture method of watercolor pigment dispersion liquid of having the process which distributes all the

mixtures of the above-mentioned component containing inorganic acid ghost particles, adsorption of the resin and the inorganic acid ghost particles to a pigment is performed more effectively -- the distributed stabilizer-ized effect of inorganic acid ghost particles -- ** -- it carries out and is more effectively discovered.

[0018]

This invention is explained in detail below.

Although a silicon oxide, titanium oxide, aluminium oxide, etc. are mentioned as inorganic acid ghost particles used by this invention, for example, a near thing is desirable colorlessness or white so that the color tone of a pigment may not be changed, amorphous silica and alumina are especially desirable and amorphous silica is desirable.

[0019]

As for the grain size of inorganic acid ghost particles, about 1-300nm is desirable. Moreover, you may use the thing which made water or water, and the organic solvent that has good compatibility distribute inorganic acid ghost particles timely. It is also possible for those mixed solvents, such as ethylene glycol, diethylene glycol, methanol, ethanol, isopropyl alcohol, and n-propanol, to be raised, for example, and to use a commercial thing as such an organic solvent.

[0020]

The content of inorganic acid ghost particles is desirable, when that it is 0.01 to 10 weight % raises the dispersibility of watercolor pigment dispersion liquid and it improves preservation stability more to a pigment. moreover, the content of inorganic acid ghost particles is 10 or less weight % -- ink jet recording -- service water -- when a sex pigment ink constituent is produced Without influencing the color tone of **, Inc., or the color tone of a printing image by inorganic acid ghost particles, after that it is further 1 to 4.5 or less weight % takes into consideration the influence of the tone change on the preservation stability improvement effect and ink, it is desirable.

[0021]

in such a dispersed system, inorganic acid ghost particles exert a stabilization effect on dispersion of a pigment -- ink jet recording -- service water -- when a sex pigment ink constituent is produced, it excels in long-term preservation stability, and a water resisting property is considered that very good watercolor pigment dispersion liquid are realizable.

[0022]

Restriction in particular does not have the pigment which can be used for this invention, and each thing of well-known common use can use it. For example, organic pigments, such as azo pigments, such as inorganic pigments, such as carbon black, titanium black, a titanium white, zinc sulfide, and red ocher, and a phthalocyanine pigment, monoazo, a JISUAZO system, a phthalocyanine pigment, and a quinacridone pigment, etc. are used. A Color Index The C.I. pigment red 9, 48:2, 48:3, 48:4, 57:1, 122, 146, 166, 176, 184, 185, 202, 242, 253, 254, 255, 256, 257, 263, 264, 269, when a number shows, (C. I.) C. I. pigment violet 19, 23, 29, and 32, the C.I. pigment yellow 17, 74, 83, 86, 93, 97, 109, 110, 117, 120, 126, 128, 139, 147, 151, 154, and 155, the C.I. pigment blues 56 and 60, 61, 76, 15:1, 15:2, 15:3, 15:4, C.I. pigment Orange 16 and 36, C.I. pigment Green 7 and 36, the C.I. pigment black 6, and 7 grades are mentioned. These pigments may choose one kind or some kinds suitably, and may use them together.

[0023]

Although it is desirable to contain inorganic acid ghost particles as a distributed stabilizer of the above-mentioned pigment in the watercolor pigment dispersion liquid of the invention in this application, reservation of a dispersion stability especially sets to the dispersion liquid of the difficult Quinacridone system pigment. It divides for the preservation stability when it being effective and forming the watercolor pigment ink composition for ink jet recording, dischargeability, the water resisting property of a printing picture, and scuff resistance, and a big effect is demonstrated.

[0024]

According to resin, can choose a water-soluble organic solvent suitably, and For example, ethylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, propylene glycol, polyethylene glycol, polypropylene glycol, And a glycol like those derivatives, and butanediol, pentanediol, hexandiol and diol like diol of the same family, Each ether of glycol ester like lauric acid propylene glycol, ethylene glycol monobutyl ether and diethylene glycol ether like carbitol, diethylene glycol monoethyl, butyl, and hexyl, propylene glycol ether, Mono-glycol ether and diethylene glycol ether like cellosolve containing dipropylene glycol ether and triethylene glycol ether, Butyl alcohol, pentyl alcohol, And a long chain alcohol like an alcohol of the same family, a sulfolane and ester, ketone, lactone like gamma-butyrolactone, lactam like N-(2-hydroxyethyl) pyrrolidone, glycerol, and other solvents like the derivative Although it can mention, it is not limited to these.

[0025]

Although inorganic acid ghost particles etc. are added as preferably as a water-soluble organic solvent, copolymerization resin, and a pigment, it mixes, grinds or distributes in the manufacture method of the watercolor pigment dispersion liquid of this invention and watercolor pigment dispersion liquid are obtained If it says from a point of the solubility of the point of the working efficiency in this process, and

resin, or bloating tendency, a high boiling point and the polyhydric alcohols of low volatility and high surface tension are desirable. Glycols, such as diethylene glycol and triethylene glycol, are especially desirable. It is satisfactory, even if glycols are generally contained in the ink composition in many cases and it remains in a final product.

[0026]

The point of causing a swelling operation of effective resin in pigment dispersion as a water-soluble organic solvent in this invention to 1,5-pentanediol or diethylene glycol is desirable. In addition, the water-soluble organic solvent of these above-mentioned may choose one kind or some kinds suitably, and may use them together.

[0027]

[an increase / since the increase in the amount of addition of these water solubility organic solvent causes the fault dissolution of a monomer component which has an acid radical, and fault swelling and increases watercolor pigment dispersion-liquid viscosity, it changes a little also with content of the styrene monomer in copolymerization resin as content of such a water-soluble organic solvent, but] (A) It is desirable that the ratios of a pigment and (B) water solubility organic solvent are (A):(B) = 1:0.1 - 1:5, and they are (A):(B) = 1:0.5 - 1:3 more preferably.

[0028]

Although the thing containing carboxylic acid, sulfonic acid, phosphoric acid, etc. can be illustrated as a monomer component which has the acid radical used in the copolymerization resin which consists of a styrene monomer used for this invention, and a monomer component which has an acid radical Especially, from a point of a dispersion stability and long-term preservation stability, the monomer containing a carboxyl group is desirable, for example, (meta) acrylic acid, maleic anhydride, etc. are mentioned. Especially (meta) in this invention, when the acrylic acid system monomer which has the structure originating in acrylic acid from a point of a dispersion stability and long-term preservation stability (meta) is used, it is desirable.

[0029]

Therefore, although it is suitable for the copolymerization resin which consists of a styrene monomer used for this invention, and a monomer component which has an acid radical that it is copolymerization resin which consists of a styrene monomer component and an acrylic acid (meta) system monomer component Instead of a styrene monomer, you may use together what uses other nonaqueous solubility monomer components.

[0030]

As such a nonaqueous solubility monomer component,

Acrylic acid alkyl ester, such as methyl (meta) acrylate and ethyl (meta) acrylate (meta);

Acrylic acid (meta) allyl ester, such as phenyl (meta) acrylate, benzyl (meta) acrylate, and phenylethyl (meta) acrylate;

Sulfonic group content (meta) acrylic ester, such as sulfoethyl (meta) acrylate and sulfopropyl (meta) acrylate;

Acrylic ester of hydroxyl group content, such as hydroxyethyl (meta) acrylate and hydroxypropyl (meta) acrylate, (meta);

Styrene system monomers, such as styrene, alpha methyl styrene, and vinyltoluene;

AKURIRONITONIRU; -- acrylamide; -- vinyl acetate; -- vinyl chloride; -- vinyl-pyrrolidone; -- vinyl alcohol; -- ethylene;; its derivative, etc. are mentioned.

these -- one sort -- or two or more sorts can be used together and it can use.

In addition, in this invention, acrylate (meta) shows acrylate and/or methacrylate, and acrylic acid (meta) shows acrylic acid and/or methacrylic acid.

[0031]

moreover, the content of said copolymerization resin in said watercolor pigment dispersion liquid is 50 or less weight % to a pigment -- ink jet recording -- service water -- it is [a tendency for the dischargeability when producing a sex pigment ink constituent to become better] and is desirable.

If it carries out from a point of the adsorption power to the pigment of resin, and the dispersion stability of a pigment, as for the content of the styrene monomer component in copolymerization resin, it is desirable that it is 50 to 90 mass %.

If it furthermore carries out from scratch nature and a waterproof point, it is desirable that the content of the sum total of the styrene monomer component in copolymerization resin and an acrylic acid (meta) system monomer component is 80 to 100 mass %.

[0032]

Moreover, from a point of long-term preservation stability, the acid number of resin has desirable 60 - 300 mgKOH/g, and its range of 100 - 190 mgKOH/g is especially desirable. When an acid number is smaller than 60, a dispersion effect is small, and there is a tendency for good dispersion liquid not to be obtained. On the other hand, if an acid number is larger than 300, it will be easy to generate condensation of a pigment.

In addition, the number of milligrams (mg) of the potassium hydroxide (KOH) which needs an acid

number to neutralize 1g of resin is said, and it expresses with mgKOH/g.

[0033]

Although the molecular weight range of resin does not have restriction in particular, it is a weight average molecular weight and 40,000 or less or more 3000 molecular weight range is desirable. Although low-molecular-weight resin is excellent in first stage dispersibility, when it thinks from a soluble point of resin, as for the molecular weight of resin, 20,000 or less are desirable [5000 or more are desirable from a point of long-term preservation stability, and].

Moreover, it becomes ink which the balance of the compatibility of a pigment and resin and the hydrophilicity of resin and water was maintained, became possible [existing in a water medium, after the pigment has been included by resin], and was excellent in resin acid value using copolymerization resin of 100 - 190 mgKOH/g at high-speed discharge.

[0034]

In the watercolor pigment dispersion liquid of this invention, it is desirable to neutralize all or a part of acidic groups of resin contained in order to make dispersibility good. If watercolor pigment dispersion liquid furthermore show acidity, when using as an ink composition for ink jet recording, the corrosion to an ink container or an ink use member etc. may be caused. Also in order to prevent this, it is required to neutralize some or all of a resin solution.

[0035]

In order to perform such neutralization operation, alkali chemicals may be used after watercolor pigment dispersion-liquid manufacture, but it is desirable to add alkali chemicals simultaneously with moisture powder in the manufacturing process of watercolor pigment dispersion liquid. By carrying out like this, copolymerization resin produces the microcapsule which covered the surroundings of it with a nonaqueous solubility monomer component like a styrene monomer for the pigment in the nucleus.

[0036]

As alkali chemicals which neutralize the monomer component which has an acid radical For example, alcoholic amine, such as triethanolamine besides basic substances, such as a hydroxide of alkali metals, such as sodium hydroxide, potassium hydroxide, and lithium hydroxide, ammonia, triethylamine, and morpholine, diethanolamine, and N-methyldiethanolamine, N, N, Bases, such as quarternary ammonium salt, such as ethylenediamine, such as N' and N'-tetramethylethylenediamine, N, N, N', and N'-tetraethyl ethylenediamine, hydroxylation tetramethylammonium, and hydroxylation tetraethylammonium, are usable.

[0037]

When the amount of addition of the alkali chemicals to the acid number of resin (this is called the neutralization rate shown in the following formulas in this invention.) is shown by the particle diameter of the pigment at the time of dispersion, about [40-200 mol %] is desirable from a dispersion stability, and it is especially desirable. [50-140mol% of] If a neutralization rate is smaller than 40mol %, it will be few and, in a pigment grain size, a dispersion effect will not become small enough. On the other hand, if a neutralization rate is larger than 200mol %, a dispersion stability may get worse, and in long-term neglect, it may change in the shape of a gel.

[0038]

A neutralization rate is the value calculated by the following formula here.

[Formula 1]

$$\text{中和率}(\%) = \frac{\text{塩基物質質量}(\text{g}) \times 56000}{\text{樹脂酸価} \times \text{塩基物質の当量} \times \text{樹脂量}(\text{g})} \times 100$$

[0039]

[after producing a mixture from copolymerization resin, a pigment, water, and a water-soluble organic solvent, grinding and distributing a pigment in the manufacture method of the watercolor pigment dispersion liquid of this invention and obtaining watercolor pigment dispersion liquid, add inorganic acid ghost particles, but] It is desirable to distribute by making this mixture contain 0.01 to 10weight % of the inorganic acid ghost particles of a pigment, and to obtain watercolor pigment dispersion liquid.

[0040]

Although the method equipment of dispersion using Media is effective as a method of distributing a pigment, the distributed equipment of well-known official business can be used. For example, an ultrasonic homogenizer, a paint shaker, a ball mill, a roll mill, a sand mill, a Sand grinder, DAINOMIRU, a DISU par mat, SCmil, spy cumyl, a nano mizer, an agitator mill, and planetary ** are mentioned.

[0041]

thus -- the watercolor pigment dispersion liquid of manufactured this invention are excellent in a dispersion stability -- ink jet recording -- service water -- when it is considered as a sex pigment ink constituent, it excels in long-term preservation stability, the water resisting property of a printing picture, and scuff resistance.

[0042]

in addition, the watercolor pigment dispersion liquid of this invention -- especially -- ink jet recording -- service water -- when using it as a sex pigment ink constituent, the water-soluble organic solvent of the aforementioned high boiling point functions also as a desiccation inhibitor of ink. Moreover, the organic solvent which has desiccation tightness and permeability further if needed may be added and adjusted, and you may filter with the filter of a desired grain size after churning and adjustment uniformly.

[0043]

Adjustment of ink has the addition of an organic solvent which has said desiccation inhibitor and permeability, and concentration adjustment and viscosity control, for example, and adds a pH adjuster, a surface active agent, antiseptics, a chelating agent, a plasticizer, an antioxidant, an ultraviolet ray absorbent, etc. if needed.

[0044]

The permeability especially in ink is characteristics required in order to adjust the diameter of a dot on the ***** of the ink to a recording medium, or a recording medium. As a water-soluble organic solvent in which permeability is shown **, for example, ethanol, Lower alcohol, such as isopropyl alcohol, There is a propylene oxide addition product of alkyl alcohols, such as an ethylene oxide addition product of alkyl alcohols, such as ethylene glycol hexyl ether and diethylene glycol butyl ether, and propylene glycol propyl ether, etc.

[0045]

By preparing suitably the watercolor pigment dispersion liquid obtained by the manufacture method of this invention It can be used conveniently for the ink for ink jet recording of well-known common use of a method on demand, for example, a PIEZO method, a thermal method, etc., and the ink discharge extremely stabilized in the all directions-type printer becomes possible.

[0046]

[Example]

A work example explains still in detail below. This invention is not limited to these work examples. In addition, the "part" in the following work examples expresses a "mass part." Moreover, measurement of a grain size and the valuation method of long-term preservation stability, a printing examination, measurement of printing image density, and the waterproof measurement of a printing picture are as follows.

[0047]

(1) Evaluation of dispersibility (measurement of a grain size) : the micro track particle-size-distribution meter ("UPA-150" by NIKKISO CO. LTD.) was used, and it measured about the recording ink diluted with purified water. The measurement conditions of equipment were set to measurement temperature:25 degree C, refractive-index:1.51 of a sample, and density:1.30 (gm/cm3) of a sample.

[0048]

(2) Long-term preservation stability evaluation : after putting watercolor pigment dispersion liquid into glass vials and putting gently for one week into a 70-degree C thermostat for an accelerated test, volume average particle diameter (A) was measured by the method of the above (1). The rate of change from the volume average molecular weight (B) before putting into a thermostat was calculated by the following formula. When the acquired numerical value was 10% or less, it was considered that long-term preservation stability was good.

[0049]

[Formula 2]

Rate of change (%) =(A/B-1) x100

[0050]

(3) Printing examination : use an ink-jet print cartridge (hp51645a / Hewlett-Packard Japan, Inc.), and it is a thermal method ink-jet printer. (H.P. deskjet 957c / Hewlett-Packard Japan, Inc.) It printed. The print sheet used Xerox 4024 Paper (Substance 20 (75g/m2), White, and Xerox Corporation).

[0051]

(4) Measurement of printing image density : printing image density was measured using the Macbeth densitometer RD-918 type.

[0052]

(5) The waterproof examination of a printing picture : the printing picture neglected after printing for 1

hour was dipped in 60-degree C warm water for 24 hours. Printing image concentration (C) was measured by the method of the above (4). The rate of change from the printing image concentration (D) before dipping in 60-degree C warm water for 24 hours was calculated by the following formula. When the acquired numerical value was more than -2%, it was considered that a water resisting property was good.

[0053]

[Formula 2]

Rate of change (%) = $(C/D - 1) \times 100$

[0054]

(Work example 1)

Styrene (77 copies), acrylic acid (ten copies), and methacrylic acid (13 copies), oxidation = 151 mgKOH/g, the weight average molecular weight 7000, ** and others -- after adding and agitating ten copies of MEK (s), 1.51 copies of potassium hydroxide, and 60 copies of water to ten copies of resin, the resin solution (I) which distills under a reduced pressure of MEK (70degreeC, 150P a), and contains solid content 20.0 mass % was obtained.

[0055]

Next, this solution is used,

- Resin (solution I): 7.5 copy

- Fast gene super magenta RTS (C. the I. pigment red 122, Dainippon Ink and Chemicals Inc. make) : ten copies

- The phthalimidomethyl-izing-3, 10-dichloro Quinacridone (average phthalimide cardinal number 1.4C-1) : 0.5 copy

- Diethylene glycol : 20 copies

- Purified water : 2.5 copies

Zirconia beads (diameter of 1.25mm): 400 copies

10:(made by amorphous silica ethylene glycol dispersing element, solid content 20wt%, and NIPPON SHOKUBAI) 2 copies of SHIHO star KE-E

After performing preparation of *****, churning was performed for 3 hours using the paint shaker, and watercolor pigment dispersion liquid (II) were obtained. After adding 25 copies of purified water to these watercolor pigment dispersion liquid (II) and performing churning for further 1 hour using a paint shaker, watercolor pigment dispersion liquid (III) were obtained.

[0056]

Next, they are five copies of 2-pyrrolidinone, five copies of 1,5-pentanediol, two copies of triethylene glycols, five copies of diethylene glycol, and 55 copies of purified water to 28 copies of watercolor pigment dispersion liquid (III). filtering with a 0.5-micrometer membrane filter, after mixing in addition -- ink jet recording -- service water -- it was considered as sex pigment ink. The obtained watercolor pigment ink does not have condensation, either and showed good dispersibility. This volume average particle diameter was 132nm.

[0057]

The grain size rate of change after 70degreeC and the acceleration stability test of 336 hours of this ink was 2%, and preservation stability was good. In the printing examination using a thermal method ink-jet printer, nozzle clogging does not have any ink immediately after manufacture and after an acceleration stability test, it was stable, and the good picture was obtained. Moreover, this printing image density was 1.10, and the rate of change of the printing image density after a waterproof examination is changeless at 0%, and showed the good water resisting property.

[0058]

(Work example 2)

The resin solution (I) of work-example 1 description is used,

- Resin (solution I): 7.5 copy

- Fast gene super magenta RTS (C. the I. pigment red 122, Dainippon Ink and Chemicals Inc. make) : ten copies

- The phthalimidomethyl-izing-3, 10-dichloro Quinacridone (average phthalimide cardinal number 1.4C-1) : 0.5 copy

- Diethylene glycol : 20 copies

- Purified water : 2.5 copies

Zirconia beads (diameter of 1.25mm): 400 copies

10:(made by amorphous silica water dispersing element, solid content 15.6wt%, and NIPPON SHOKUBAI) 2.6 copies of SHIHO star KE-W

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(54) 【発明の名称】 水性顔料分散液及びインクジェット記録用インク組成物

(57) 【要約】

【課題】長期保存安定性と印刷画像の耐水性とを同時に満たす、インクジェット記録用水性顔料インク組成物を作製するに好適な水性顔料分散液を提供する。

【解決手段】顔料、水溶性有機溶剤、及びスチレンモノマーと酸基を有するモノマー成分との共重合樹脂を含有する水性顔料分散液であって、スチレンモノマー成分の含有率を50～90重量%とし、顔料に対して0.01～10重量%の無機酸化物微粒子を添加する。顔料がキナクリドン系顔料のとき特に大きな効果を発揮する。

【選択図】 なし